

0.5
D

U. S. Department of Agriculture - Forest Service
CENTRAL STATES FOREST EXPERIMENT STATION
Columbus, Ohio

NORTHEASTERN FOREST EXPERIMENT STATION
OFFICE LIBRARY

Station Note
No. 6

Oct. 1, 1933.

GROWTH OF BLACK LOCUST

L. F. Kellogg
Associate Silviculturist

Black locust is reputed to grow very rapidly, and where conditions are most favorable, it does produce phenomenal growth. There is danger, however, of expecting more of this species than is justified. In a great majority of places where it has been and is likely to be planted, and particularly on most eroded lands, very high growth rates should not be expected. Except for limited localities (such as the belt of loessal and unconsolidated soils extending from northern Mississippi to the mouth of the Illinois River), locust used for erosion control must be expected to exhibit at best only average growth. Yield plot measurements made in some 250 plantations in Ohio, Indiana, Illinois, and western Kentucky and Tennessee may be used as a basis for approximating the growth of this species. Few plantings over 50 years of age were found and most of them were 30 or younger.

Growth in height varies directly with the quality of the site and is reduced by attacks of the borer. At 10 years of age on the poorest sites for locust, the dominant trees average only 15 feet high; on medium sites, about 30 feet high; and on the best sites, as high as 45 feet. At 25 years of age, the heights of the tallest trees on the poorest, average, and best sites are about 25 feet, 50 feet, and 70 feet, respectively. At 40 years, the heights run 30 feet, 60 feet, and 85 to 90 feet, respectively. Some natural sprout stands in the Appalachians have exceeded these heights by 10 to 20 feet. Sprout stands of locust ordinarily display straighter stems with less taper than do trees from planted seedlings.

A plantation in Jefferson County, Indiana, provides a typical example of a poor stand. Although it was 25 years old in 1932, the height of the tallest trees was only 32 feet. The tops were open and thin and growth was slow, averaging about 1.3 feet yearly. The stand allowed so much light to reach the ground that eastern red cedar reproduced beneath the locust. The stand was also badly attacked by the locust borer. In contrast, a 27-year-old plantation in Bartholomew County, Indiana, illustrates very good growth. The largest trees are 75 feet tall and 14 inches in diameter. Height growth has averaged about 2.8 feet a year.

Diameter growth also varies according to quality of the site, as is shown by the measurements secured in several typical 10-year-old plantations. On a very poor locust site in Tennessee the largest tree was 3 inches in diameter, but the average was only 1.6 inches; on a medium site in Illinois, some trees reached a diameter of 5 inches, but the average was 2.8 inches; on an excellent site in Indiana the largest dominant tree was 7 inches in diameter,

(over)

and the stand averaged 4.4 inches. Measurements made in typical 25-year-old plantations located on a poor site in Ohio, on an average site in Indiana, and on an excellent site in Tennessee, recorded maximum diameters of 7, 10, and 13 inches, respectively; the average diameters for the same three plots were 4.1 inches, 6.0 inches, and 8.4 inches. On an excellent site in southern Indiana a 40-year-old plantation produced trees from 8 to 17 inches in diameter, averaging 10.8 inches. Diameter growth is often erratic and distorted following severe locust borer attacks.

Time Required for Special Products. The various products, such as fence posts, insulator pins, wagon hubs, tree-nails, mine timbers, and poles, for which black locust is utilized, have been discussed at length by John B. Cuno in U.S.D.A. Circular 131 - The Utilization of Black Locust. All of these uses depend upon the qualities of durability, hardness, and strength possessed by the wood of this species. It becomes pertinent to know how soon various products can be secured from planted stands. Measurements of over 400 locust trees in plantations in Ohio, Indiana, and Illinois, for the construction of volume tables, provide a basis for determining these ages for locust sites, such as occur north of the Ohio River.

Fence Posts. Although very small posts are sometimes used for special purposes, the commercial fence post is usually 7 to 8 feet long, with a top diameter of 4 to 6 inches. Nothing less than a tree 5 inches in diameter at breast height will yield a standard post, and the most profitable production is from slightly larger trees, which will yield several posts each. Ordinarily it requires from 15 to 20 years to grow locust trees of standard post size. In instances of unusually good growth, a few of the dominant trees may reach the necessary size for posts at an earlier age, but they will be in the minority.

It has been frequently stated by various authorities that locust posts are produced at much earlier ages than those stated above, but analysis of these statements discloses that there is considerable difference of opinion as to what constitutes a post. The longevity and durability for which locust posts are noted cannot be expected from the use of small pieces, or from very rapidly grown trees in which the proportion of durable heart wood is low.

Bolts. For the manufacture of insulator pins, wagon hubs, and tree-nails, locust is cut and handled in bolt form. According to Cuno, bolts 5 to 7 inches in diameter just about carry the cost of production, whereas profitable manufacture comes from utilizing bolts 8 inches and over. Trees at least 10 inches in diameter are required to produce bolts of this size. On the best sites they can be grown in about 30 years, and on average sites in about 40 years. With further increase in the age and size of the trees, bolts will become larger and more profitable to manufacture. Consequently the stumpage value and yield also increase.

Volume and Yield Tables. Field data, previously referred to, have been secured for the construction of both volume and yield tables for black locust, but the publication of this emergency report could not be delayed until all tables were completed. They will be made available to supplement this report as they are completed.